UNIVERSITY OF ALBERTA LIBRARY
0 1620 0205 2171

TD
196
P4
P244
1991
POLAR

EX LIBRIS
UNIVERSITATIS
ALBERTÆNSIS

PARKER ASSOCIATES, INC.

RECOMMENDATIONS FOR THE
UTILIZATION OF VERY LARGE
OIL SKIMMERS IN RESPONSE
TO CATASTROPHIC OIL SPILLS

Prepared for:

The Alaska Citizen's Oversight Council
on Oil and Other Hazardous Substances

by

Walter B. Parker
24 January 1991

Canadian Circumpolar
Library
B-03 Cameron

ACE 5275250

3724 CAMPBELL AIRSTRIP ROAD • ANCHORAGE, ALASKA 99504 • (907)333-5189

UNIVERSITY LIBRARY
UNIVERSITY OF ALBERTA

In planning for response to a major oil spill it is wise to remember that the spill can occur in any kind of weather anywhere along the tanker routes. Conventional planning has relegated high seas spills largely to treatment by natural dispersion in the water column, as occurred with the Khark V off the coast of Morocco in 1989 or with the Argo Merchant off the coast of New England in 1976. In both cases the winds were favorable to the coastal environment by blowing the oil out to sea. This is also known as the "out of sight, not our concern" system of oil spill response. Those responsible for oil spill response have shown little concern for the effect of the dispersed oil on oceanic systems. Thus, oil spill response equipment has generally been built to work in protected waters in calm or very light sea states.

Of the three types of oil spill response--mechanical, chemical, and burning--mechanical is the most favored and also the most limited by weather and sea state. Chemical responses have been largely limited to different types of dispersants that are usually brought into play when the oil threatens a coastline and weather will not permit a mechanical response. For two decades there has been strong discussion about the effects of dispersants on the marine environment with little more agreement now than after the Torrey Canyon spill (1967) and Santa Barbara (1969). When all else fails, burning becomes the favorite response mechanism with the main problem being to get a good burn going.

Since mechanical recovery is, when properly done, the least environmentally damaging and the safest method, it would seem a proper course of action to do the best job possible with it.

ACE 5275251

Unfortunately, in the very best cleanups after large spills, not to mention major spills, only 20 percent of the oil is recovered. The American Trader spill at Huntington Beach, California, on February 7, 1990, occurred in the immediate vicinity of the two most effective oil spill cooperatives in North America; those of Long Beach and Santa Barbara. Equipment was on the scene immediately to begin booming and skimming the oil. Weather was good for the first day but the oil went on the beach the day after the spill and, ultimately, only 21 percent of the 9,458 barrels spilled were judged to be recovered. Much more typical was the recovery rate of the Exxon Valdez where after two years of effort and about $2 billion in expenditure, about 7 percent of the oil has been recovered; or about 18,000 barrels of the 260,000 that was spilled.

The main problem with mechanical recovery is that existing skimmers do not recover oil fast enough in the period immediately after the spill; they do not get on the scene fast enough in most cases and they do not work at all in sea states over six feet and not very well in waves over three feet. Thus, at best they are a fair-weather alternative. Essentially most of the equipment has been designed to recover oil in protected harbors and waterways. As pointed out previously, recovery on the high seas or exposed coastlines has never been a priority for the shipping industry or the responsible government agencies.

ACE 5275252

By the early 1970s there had been enough large spills that it was obvious to the more progressive and caring persons in the shipping and oil industries that better technology was needed for large spills and bad weather spills. Mobil proposed converting a 20,000-ton tanker to a skimmer as a demonstration but could secure no strong support and dropped the idea. Following a series of large spills in the late 1970s, most notable the Amoco Cadiz, Exxon Production Research proposed a similar solution, converting a coastal tanker of 24,000 tons to a skimmer. This proposal did not get out of the company for formal distribution and was shelved. After the wreck of the Exxon Valdez, ARCO Marine proposed a 70,000-ton tanker/skimmer. This idea received no strong public support from ARCO's partners or the Alyeska Pipeline Service Company management and is now largely dormant.

The ARCO skimmer, known affectionately as "Big Gulp," was proposed to have a recovery capacity of 45,000 barrels per hour; Alyeska's largest skimmers recover 4,200 barrels per hour and its entire fleet of skimmers about 24,000 barrels per hour. The above figures are for total recovery of oil and water. Actual recovery of oil is highly dependent upon wind and sea state. It can range from 50 percent to 5 percent for winds under 30 knots and is effectively nothing for winds over 30 knots.

The ARCO skimmer would have a built-in capacity of 500,000 barrels; whereas typical skimmers have a capacity of less than 100 barrels with the largest holding 39,000. Much time is lost unloading skimmers into barges or tankers in the critical first 24 hours after a spill.

ACE 5275253

Without at least one very large skimmer it is difficult to see how Alyeska will meet the State of Alaska's statutory requirement to recover at least 300,000 barrels in the first 72 hours after a spill; or its requirement to have sufficient equipment mobilized within 72 hours to handle a worst-case spill. A worst-case spill is still being defined by the Alaska Department of Environmental Conservation, but it is usually accepted as the total loss of cargo for the largest tanker operating from a port; or 1,800,000 barrels in the case of Valdez.

Preliminary calculations by DEC staff and Alaska Oil Spill Commission staff indicate that a recovery capacity of 80,000 barrels per hour would be necessary to meeting the requirement of recovering 300,000 barrels of oil within the first 72 hours. Time to mobilize, hours of daylight, weather and sea state are all factors that must be considered. The above case is for a winter operation with only six hours of daylight and 20 percent recovery efficiency, assuming moderate weather conditions. Adding an ARCO skimmer type to the present Alyeska fleet of smaller skimmers would bring the recovery system close to being in compliance with the statute.

The advantages of the very large skimmer are:

- the ship will have good stability in higher sea states;
- there is a large storage capacity for recovered oil;
- there is a large initial recovery rate as soon as the ship is on station.
- oil/water separation capability can be high because residence time in the storage tanks will permit good separation;

ACE 5275254

- the skimmer will have good transit time to the spill site; and
- the ship's size permits flexibility in the design of collection systems.

The disadvantages of the large skimmer are:

- it cannot operate in shallow water; and
- it is not as maneuverable as smaller skimmers.

The above disadvantages merely point out that a well-designed system will need both types of skimmers, large and small, not simply small skimmers as we have now.

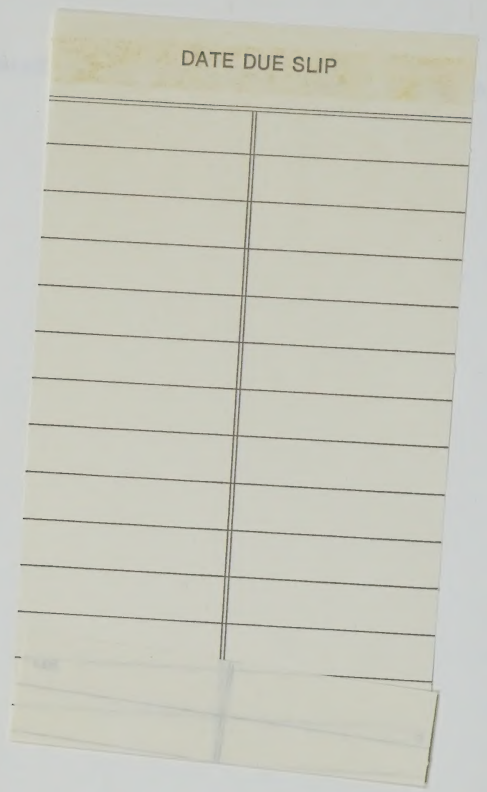
Other methods of greatly increasing mechanical recovery rates that are under consideration are to utilize the Corps of Engineers' dredge fleet as an integral part of the system. Dredges worked well on the Exxon Valdez spill and have been utilized on other spills. A federal study by the Secretary of the Army is required by Section 4112 of the Oil Pollution Act of 1990, to be completed by August 1991. Some aspects of this study had been accomplished before passage of the act.

If a prototype very large skimmer were to prove as effective as present research indicates it would be, the concept would be appropriate to incorporate in each of the national spill response centers proposed by the American Petroleum Institute in 1989 in the aftermath of the Exxon Valdez incident. With three such vessels on the East Coast and three on the West Coast in San Francisco, Seattle, and Valdez, it would be possible to consider mechanical recovery as a truly viable alternative for handling large oil spills. Without such action we will go on recovering very small

ACE 5275255

rcentages of the spilled oil or seek other means of handling
rge oil spills.

ACE 5275256


DATE DUE SLIP

University of Alberta Library
0 1620 0205 2171